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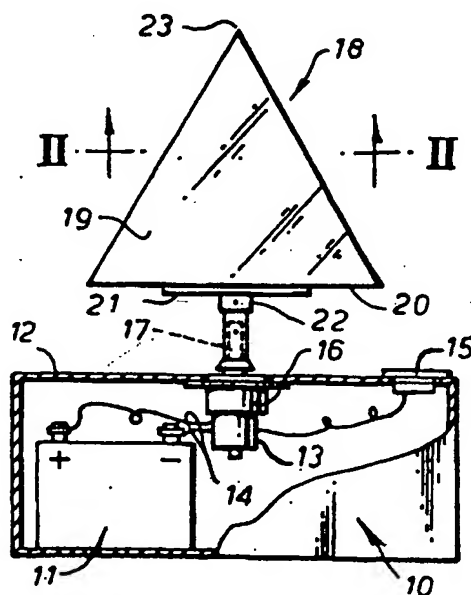
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(54) Title: BIRD SCARING APPARATUS



(57) Abstract

Apparatus for scaring birds from a particular area has a housing (10) within which is provided an electric motor (13) driving a vertically extending shaft (17). A three-dimensional object (18) is mounted on the shaft (17) externally of the housing (10), which object has a number of highly reflective surfaces (19). Typically, the object (18) may be a tetrahedron constructed from three mirrors each of equilateral or isosceles shape, with the apex (23) uppermost and on the shaft axis. The motor (13) may be powered by an accumulator, a panel of solar cells or low voltage electricity transformed from the domestic mains supply.

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## BIRD SCARING APPARATUS

This invention relates to bird scaring apparatus, such as may be employed in an agricultural environment, to discourage birds from eating or otherwise damaging growing produce, fish or the like, or to discourage  
5 birds from invading an industrial environment such as an oil rig or an airport.

There have been many proposals for agricultural and horticultural bird scaring apparatus. At the simplest, such apparatus may comprise no more than a  
10 rigid figure arranged in a field, in the hope that it will discourage birds from alighting on and then eating growing produce. The effectiveness of such a traditional "scarecrow" may be enhanced by suspending from it shiny objects which will move in the wind, so  
15 that birds will be distracted by the varying reflected light. Despite that, such equipment performs only relatively poorly.

Other proposals use sound, in an attempt to scare away birds. For example, one known form of apparatus  
20 is arranged to fire an explosive cartridge at regular intervals and relies on birds being frightened away by the unexpected noise. It is also known to use ultrasound, particularly when only a relatively small area is to be protected - such as a pond, to scare away  
25 fishing birds.

The present invention aims at providing a relatively simple form of apparatus which nevertheless is effective at scaring away birds, from a significant area.

30 Accordingly, the present invention provides bird scaring apparatus comprising a plurality of highly reflective surfaces arranged to form a three-dimensional multi-faceted reflecting object, and power drive means arranged to support the object and to

effect rotation of the object about a substantially vertical axis.

Most preferably, the angle between the horizontal and at least some of the reflecting surfaces, externally of the three dimensional object, is greater than 90°. In this way, said at least some of the reflecting surfaces will face upwardly away from the axis of rotation. In this case, the rotation of the reflecting object catches light as it rotates, sending back into the sky reflected beams of light, especially when the sun shines. Trials have shown that these reflected beams are unexpectedly effective at scaring away birds from around the area where the apparatus has been installed.

In a preferred embodiment, the reflecting surfaces are arranged to provide a three-dimensional object in the form of a pyramid with the apex uppermost. Advantageously, such a pyramid has three similar reflecting surfaces arranged on a triangular base - that is to say, the reflecting object is in the form of a tetrahedron. In a case where the reflecting object is in the form of a pyramid, the apex of the pyramid should lie substantially on the axis of rotation of that object.

Trials and tests on the apparatus have shown that the angle each reflecting surface of the reflecting object makes to the horizontal is important, having regard to the intended use of the apparatus. I have now found that different birds will be scared by different reflecting angles and the configuration of the reflecting object should be selected having regard to the target to be protected and also the kinds of birds to be scared by the apparatus. The internal angle (of the three-dimensional object) each reflecting surface makes with the horizontal may vary from an acute angle

through substantially vertical to an obtuse angle to the horizontal.

In addition, there may be advantages in providing differently coloured reflecting surfaces on the reflecting object. For some applications, simple silvered mirrors, reflecting all light falling thereon, may be sufficient. For others, all of the reflecting surfaces may be tinted with the same colour - for example, it has been found that orange-coloured reflecting surfaces are particularly effective when pigeons are to be targeted. Another possibility is to tint adjacent faces of the reflecting object with different colours. For example, it has been found that by colouring two faces red and leaving the third face of the reflecting object to reflect all light, good results are obtained with rooks and crows.

The power drive means conveniently includes an electric motor drivingly connected to the multi-faceted reflecting object. Such an electric motor may be of the low-voltage kind so that it may be powered by a battery, such as a lead-acid accumulator of the type employed in motor vehicles. This has the added advantage of being relatively safe, even should the apparatus inadvertently become wet for example during periods of rain. To minimise the likelihood of this, the power drive means may be contained in a waterproof housing.

When the apparatus is intended for domestic use, to scare birds from a relatively small vegetable plot in a garden or possibly from a pond, it is convenient to provide an electric motor to effect rotation of the reflecting object which motor is powered by the domestic mains supply. However, in the interests of safety, it is preferred for the motor to require relatively low voltage AC or DC, and for the power for that motor to be transformed from the 240v domestic

mains supply down to a safe voltage such as 12v. If appropriate, the alternating current supplied from a transformer may be rectified for powering a DC motor.

5 Another possibility would be to provide a bank of solar cells which may supply current to a rechargeable battery and for the electric motor to be powered by the battery. The battery should have a suitable capacity to ensure the motor may be driven for extended periods when there may be no sunshine, but as at least some  
10 sunshine may be expected most days during the growing season, the capacity of the battery may be significantly smaller than would be required in the event that no solar recharging arrangement were provided.

15 Rather than employing solar cells to effect recharging of a battery, wind power could be employed for this purpose, provided the apparatus be installed at a sufficiently exposed location. Wind power probably would not be suitable for use in a domestic  
20 garden, but could be used agriculturally, in a field. An alternative possibility for domestic use would be to employ a clockwork mechanism, which could be wound up, say, once every 24 hours and provide sufficient energy to effect rotation of the reflecting object at a  
25 relatively slow rate, for at least the hours of daylight.

It will of course be appreciated that the reflecting object need not be rotated during the hours of darkness since there are few birds active then, and  
30 in any event there is little light to be reflected from the reflecting object. Consequently, it is preferred for the apparatus to include switch means to inhibit rotation of the object other than during the daylight hours. Such switch means could be light-activated or  
35 could be in the form of a time switch which may be preset to turn on and off at pre-selected times.

If the reflecting object is rotated continuously during daylight hours, birds could become used to the reflections and so ignore it. To prevent this happening, there could be advantages in having the power drive means arranged to operate cyclically, for pre-set on periods alternating with pre-set off periods. Further benefits may be obtained if these on and off periods are of variable lengths, either randomly or following some pre-determined regime.

Experiments have shown that the performance of the apparatus may be optimised by an appropriate selection of the rate of rotation of the reflecting object. In the case of a pyramidal three-dimensional object, it is preferred for the object to be rotated at a rate within the range of from about 25 to about 50 rpm. Particularly good results have been obtained with a rotational rate in the range of 30 to 35 rpm.

By way of example only, certain specific embodiments of the present invention will now be described in detail, reference being made to the accompanying drawings, in which:

Figure 1 is a vertical section through a first embodiment of bird scaring apparatus constructed and arranged in accordance with the invention;

Figure 2 is a cross-section through line II-II marked on Figure 1;

Figure 3 is a partial sectional view through a second embodiment of bird scaring apparatus; and

Figures 4 to 6 show alternative embodiments of bird scaring apparatus of this invention.

In Figure 1, there is shown a housing 10 having a removable side wall (not shown) and in which may be located a lead-acid accumulator 11 such as a conventional 12 volt car battery. Mounted in the lid 12 of the housing 10 is an electric motor 13, the connecting wires 14 of which are suitably terminated,

to permit those two wires to be connected to the two terminals respectively of a battery located in the housing. For example, the wires could be provided with screw-eyes, as shown, or for convenience of connecting and disconnecting the battery, the wires could carry bulldog clips. In an alternative arrangement, the battery could be arranged externally to the housing 10, in a separate enclosure.

Mounted in the lid 12 of the housing is a photocell 15, connected back to a suitable switching arrangement in the motor casing. For example, a solid state switch could be employed, connected to supply power to the motor 13 only when the ambient light exceeds some pre-set value.

The motor output shaft is coupled to a coaxial gearbox 16 which has a shaft 17 projecting through the lid 12 of the housing. A suitable seal (not shown) is provided around that shaft, to prevent the ingress of water, neither to the gearbox nor to the interior of the housing.

The apparatus further comprises a reflecting three-dimensional object 18, in the form of a tetrahedron made up from three similar planar mirrors 19 (only one of which is visible in the drawing), each of equilateral shape, and a base panel 20 of the same shape and dimensions of the mirrors 19. A circular face plate 21 having a boss 22 is attached to the base panel 20 such that the axis of the boss 22 passes through the apex 23 of the reflecting object 18. The boss 22 fits on to the output shaft 17 from the gearbox; a pin may pass diametrically through both the boss and the shaft, or the end of the shaft may be D-shaped and the aperture in the boss may be similarly shaped, so that rotation of the shaft is imparted to the reflecting object 18.



The motor and gearbox are arranged so that in use, the object 18 will rotate at about 30 to 35 rpm. The housing should be positioned in an area to be protected so that the reflecting object is above the level of the growing produce. Tests and trials have shown that  
5 light reflected from the object serves unexpectedly well at discouraging birds from alighting on the growing produce.

Figure 3 shows apparatus similar to that of Figure  
10 1 and like parts are given like reference numerals; those parts will not be described again here. The apparatus of Figure 3 employs a housing 25 having a lower profile than the housing 10 of Figure 1, and instead of incorporating an accumulator within that  
15 housing, power for the motor 13 is obtained from a solar cell panel 26 fitted in the lid 27 of the housing. There is no need for a separate photocell, for the solar cell panel 26 will not generate sufficient power to rotate the object 18 other than  
20 when the daylight intensity exceeds some minimum value.

It will be appreciated that in general, there is no need for an area to be protected other than during the hours of reasonable levels of daylight, since birds do not normally feed on crops during the hours of  
25 darkness or when it is raining.

Figures 4 to 6 show three alternative arrangements from those of Figures 1 and 3. Any of these three further arrangements could use the housing assembly of either of these two Figures, but in Figure 4, the boss  
30 30 is formed as an elongate shaft so that the reflecting object 18 is situated at a relatively great height above the housing 10. Such a configuration may be used with growing crops such as wheat, in which case, the length of the boss 30 might be 500-750mm, or  
35 so.

In the embodiments of Figures 5 and 6, the reflecting object is constructed from triangular panels 31 and 32 respectively, which panels are of isosceles shape. The panels 31 shown in Figure 5 have a  
5 relatively short base and long sides, to give an object with a small included angle at the apex. The panels 32 shown in Figure 6 have a relatively long base and short sides, to give an object with a large included angle at the apex.

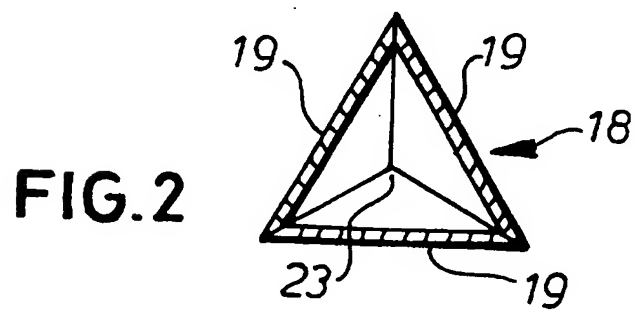
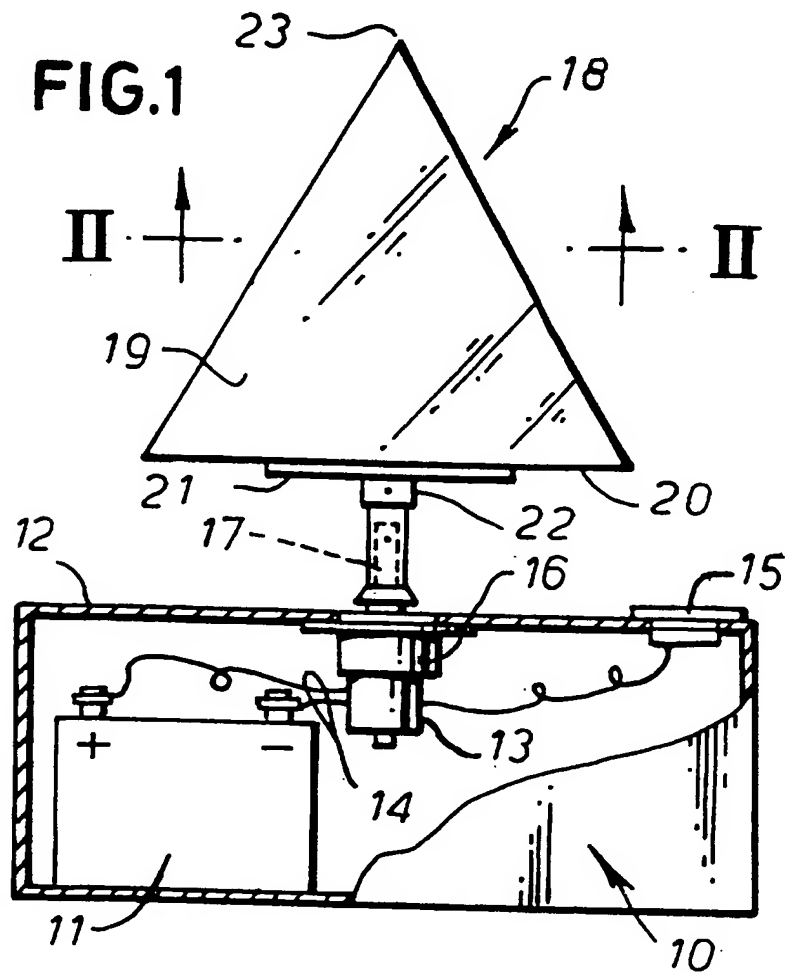
10        Though the objects described above are all tetrahedrons, objects of other shapes could be employed. For example, the objects could be pyramidal, and so on a square base. Alternatively, more complex three-dimensional objects could be employed, possibly having  
15 the reflecting surfaces at various angles to the horizontal.

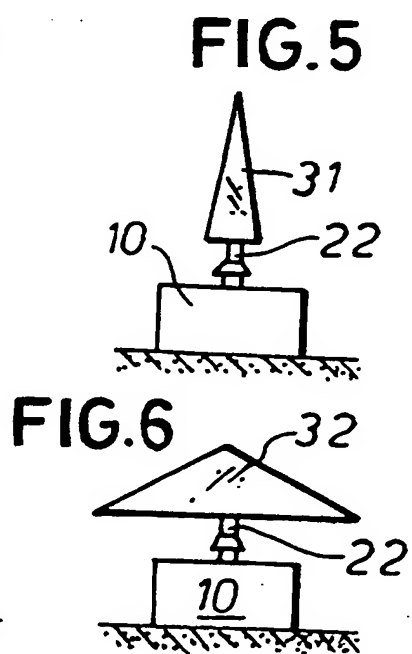
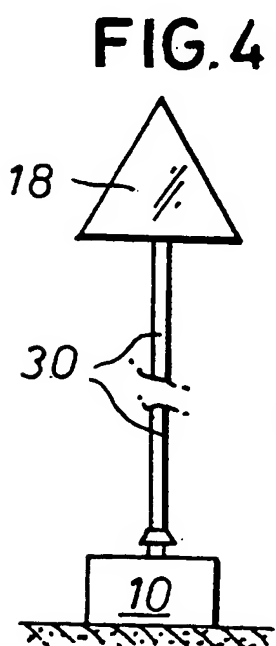
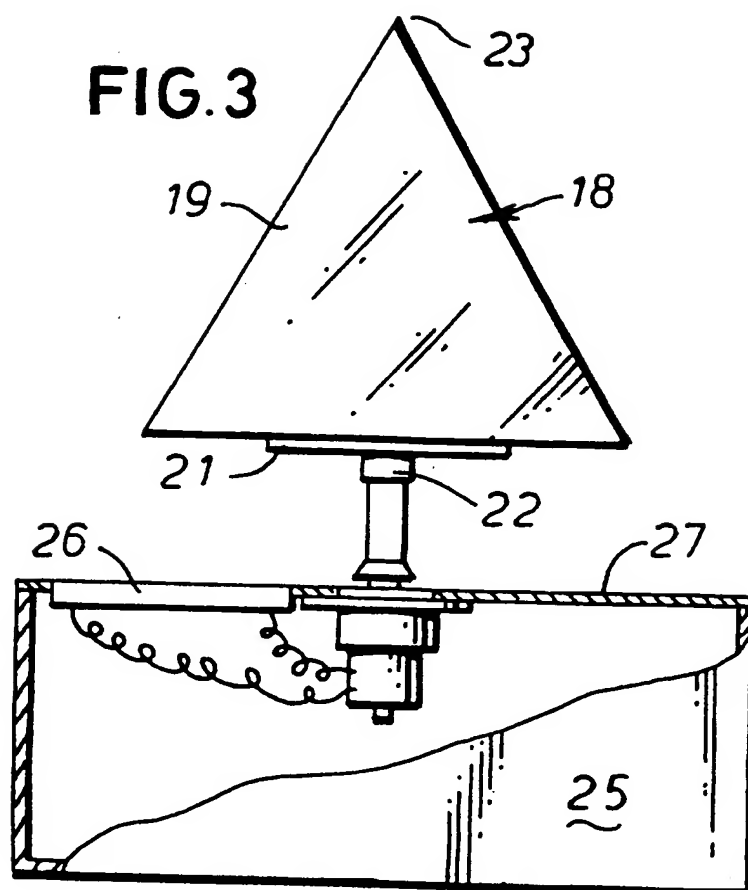
      The shape and configuration of the three-dimensional object, and also of any tinting applied to the reflective surfaces, may be selected having regard  
20 to the birds expected to be in the area where the apparatus is to be positioned. The apparatus may thus be "tuned" to the particular birds in order to optimise the scaring effect.

## CLAIMS

1. Bird scaring apparatus comprising a plurality of highly reflective surfaces arranged to form a three-dimensional multi-faceted reflecting object, and power drive means arranged to support the object and to effect rotation of the object about a substantially vertical axis.
2. Bird scaring apparatus as claimed in claim 1, wherein the angle between the horizontal and at least some of the reflecting surfaces externally of the three dimensional object is greater than  $90^\circ$ , so that those reflecting surfaces face upwardly away from the axis of rotation.
3. Bird scaring apparatus as claimed in claim 1 or claim 2, wherein each reflecting surface is substantially planar.
4. Bird scaring apparatus as claimed in any of the preceding claims, wherein the reflecting surfaces are arranged as a pyramid with the apex uppermost.
5. Bird scaring apparatus as claimed in claim 4, wherein the pyramid has three similar reflecting surfaces arranged on a triangular base.
6. Bird scaring apparatus as claimed in claim 4 or claim 5, wherein the apex of the pyramid lies substantially on the axis of rotation of the power drive means.
7. Bird scaring apparatus as claimed in any of the preceding claims, wherein each said reflecting surface comprises a mirror.
8. Bird scaring apparatus as claimed in claim 7, wherein at least some of the mirrors are tinted.
9. Bird scaring apparatus as claimed in any of the preceding claims, wherein the power drive means includes an electric motor drivingly connected to the multi-faceted reflecting object.

10. Bird scaring apparatus as claimed in claim 9, wherein the electric motor is one of battery-operated, powered by solar cells, or by low voltage electricity transformed from the domestic mains supply.
- 5 11. Bird scaring apparatus as claimed in claim 9 or claim 10, wherein the object is carried on a shaft arranged for rotation about said axis, and the motor is drivingly coupled to the shaft to cause rotation of the shaft at a rate of from about 25 to about 50
- 10 revolutions per minute.
12. Bird scaring apparatus as claimed in claim 11, wherein the shaft is caused to rotate at a rate of from 30 to 35 revolutions per minute.
13. Bird scaring apparatus as claimed in any of the
- 15 preceding claims, wherein means are provided to cause rotation of the object only during daylight hours.
14. Bird scaring apparatus as claimed in any of the preceding claims, wherein the power drive means is contained in a water-proof housing.





# INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 96/02394

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 6 A01M29/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 6 A01M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	PATENT ABSTRACTS OF JAPAN vol. 95, no. 002 & JP 07 031355 A (SEKISUI KAGAKU KK), 3 February 1995, see abstract	1
A	EP 0 011 525 A (ASSOULINE DAVID) 28 May 1980 see page 2, line 24 - page 3, line 1 see page 3, line 34 - page 4, line 16 see claims; figures	1-3
A	FR 1 261 044 A (RAYMOND) 4 April 1961 see the whole document	1,7,9,10
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

9 January 1997

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>DATABASE WPI  Section PQ, Week 8551  Derwent Publications Ltd., London, GB;  Class P14, AN 85-322301  XP002021831  &amp; SU 1 161 054 A (SAMARKANDA UNIV) , 15  June 1985  see abstract</p> <p style="text-align: center;">---</p>	1
A	<p>GB 23 568 A (HUME) 9 October 1913  see page 1  see page 3, line 36 - line 46; figures</p> <p style="text-align: center;">-----</p>	1



# INTERNATIONAL SEARCH REPORT

Information on patent family members

Int'l Application No

PCT/GB 96/02394

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP-A-0011525	28-05-80	FR-A- 2450058 AT-T- 211 CA-A- 1141140 JP-A- 56109539 US-A- 4269008	26-09-80 15-10-81 15-02-83 31-08-81 26-05-81
FR-A-1261044	06-09-61	NONE	
GB-A-23568		NONE	